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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,777	01/27/2004	Masaki Matsushita	60710 (70904)	8288
21874	7590	10/24/2006	EXAMINER	
EDWARDS & ANGELL, LLP			VO, ANH T N	
P.O. BOX 55874			ART UNIT	
BOSTON, MA 02205			PAPER NUMBER	

2861

DATE MAILED: 10/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/766,777

Applicant(s)

MATSUSHITA ET AL.

Examiner

Anh T.N. Vo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-9 and 17 is/are allowed.
- 6) ☒ Claim(s) 10, 13, 14 and 16 is/are rejected.
- 7) ☒ Claim(s) 11, 12, AND 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

NON- FINAL REJECTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/09/2006 has been entered.

Claim Rejections

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior arts are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10, 13-14 and 16 are rejected under 35 USC 103 (a) as being unpatentable over Sugimoto et al (US 5,565,899) in view of Nagasaki et al. (US Pat. 6,036,305).

Sugimoto et al discloses in Figures 20-22 an ink jet recording apparatus comprising:

- an ink storage section (1100 or 1000) for storing ink therein;
- an ink supplying path (1600a) for supplying the ink stored in the ink storage section to a print head (400a);

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- an electrode (700b) for detecting whether the ink is present or absent in the ink supplying path (1600a) (column 21, lines 50-56) to generate a detection signal;
- a first filter (700a) and second filter (700) in the ink supplying path (1600a), the first and second filters having different filtration accuracies, the first filter (700a) located upstream to the second filter (700), the second filter (700) has a larger filtration accuracy than the first filter (700a); and
- an amount of the ink supplied into the ink supplying path being .08cc (column 19, lines 17-18);
- wherein the filter has a mesh shape (column 19, line 35).

However, Sugimoto et al. does not disclose that a filter in the ink supplying path has a water-repelling property and an amount of the ink supplied into the ink supplying path is 1.0cc.

Nagasaki et al. teach in Figures 9-11 an ink cartridge comprising a filter (64) in the ink supplying path (63) having a water-repelling property (column 9, lines 14-15).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teaching of Nagasaki et al. in the Sugimoto et al. ink jet apparatus for the purpose of facilitating the removal of air bubbles from a filter at a minimum level (column 10, lines 1-5).

It is noted that selecting “an optimum amount of the ink supplied into the ink supplying path being 1.0cc.” instead of “an amount of the ink supplied into the ink supplying path being .08cc” as recited in the Sugimoto et al. reference” is considered to be a matter of a design expedient for one of ordinary skill in the art for the purpose of controlling ink flow rate at the ink supplying path. Also, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233

Response to applicant's Arguments

The applicant argues that Sigimoto et al fails to suggest that the second filter (700) has a larger filtration accuracy than the first filter (700a). The argument is not persuasive because the second filter (700) as shown in Figure 20 of Sigimoto is placed down stream from the first filter (700a) to further filter out particles passing through the first filter. Thus, the second filter (700) must have larger filtration accuracy than the first filter (700a).

Allowable Subject Matter

Claims 1-4 and 17 are allowable. These claims would be allowable because none of the prior art references of record discloses an image forming apparatus comprising an amount of the ink supplied into the ink supplying path per minute is set such that a signal to noise ratio of a detection signal produced by the electrode is not lowered even when an air bubble is created in the ink supplying path, and such that an ink depletion accuracy of the electrode is not lowered even if an air bubble is created in the ink supplying path in the combination as claimed.

Claim 15 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims. This claim would be allowable because none of the prior art references of record discloses an image forming apparatus satisfying:

$$n.N.R.B > 2.\gamma.h,$$

where n (N/m) is a surface tension of the ink, N (cells/m) is a cell density of the ink absorbing body before contained in the ink storage section, R is a compression ratio that is a ratio between a volume of the ink absorbing body after contained in the ink storage section, and a volume of the ink absorbing body before contained in the ink storage section, γ is a specific gravity of the ink, h (m) is a maximum water head of the ink in a perpendicular direction with respect to an ink supply outlet of the ink storage section under arbitrary orientation, and B is a coefficient = 4.08×10^{-10} in the combination as claimed.

Claims 5-9 are allowable. These claims would be allowable because none of the prior art references of record discloses an image forming apparatus satisfying:

$$(4.Q/(\pi d))/v \leq 2,$$

where $v(m/s)$ is a dynamic viscosity of the ink, $d(m)$ is a diameter of the ink supplying path, $Q(m/s)$ is an average ink supply amount.

Claim 11 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims. This claim would be allowable because none of the prior art references of record discloses an image forming apparatus satisfying:

$$F1 < F2 \leq 2F1,$$

where $F1(m)$ is a filtration accuracy of the first filter, and $F2(m)$ is a filtration accuracy of the second filter in the combination as claimed.

Claim 12 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims. This claim would be allowable because none of the prior art references of record discloses an image forming apparatus satisfying:


$$F1 < F2 \leq DB,$$

where $F1(m)$ is a filtration accuracy of the first filter, and $F2(m)$ is a filtration accuracy of the second filter, and $DB(m)$ is a diameter of an air bubble created when an air bubble created in the ink supplying path passes through the first filter in the combination as claimed.

CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Anh Vo whose telephone number is (571) 272-2262. The examiner can normally be reached on Tuesday to Friday from 9:00 A.M. to 7:00 P.M..

The fax number of this Group 2861 is (571) 273-8300.


ANH VO
PRIMARY EXAMINER

10/19/2006